

BIOCOMPATIBLE IMPLANTS
ABSTRACT OF THE DISCLOSURE

A biocompatible surgical implant or component for a surgical implant for use in human beings and animals is described. The implant has an oxide film-forming valve metal substrate, such as titanium, titanium alloy, zirconium, or zirconium alloy, or stainless steel, or cobalt-chromium-molybdenum alloy having a surface that has been treated such that phosphorous and oxygen are incorporated into the treated surface of the implant. The surface treatment carried out on the implant includes low temperature anodic treatment of the substrate in a phosphorus-containing solution, such as a phosphate-containing solution. The anodic treatment changes or modifies the substrate surface through electrochemical reactions between the substrate, acting as an anode, and phosphate ions contained in an electrolyte solution, such as provided by an aqueous solution of phosphoric acid. The phosphorus-containing solution may be substantially calcium-free. The anodic treatment is effective on various metal surfaces, including alloys containing less than 98 percent titanium.